

REMARKS

This application is amended in a manner believed to place it in condition for allowance.

Status of the Claims

Claim 3 is amended, and claim 7 is new. Support for the amendment may be found, for example, at page 6, lines 3-11 and page 10, lines 3-7 in light of page 8, lines 3-6 and 10-15, page 9, lines 8-10 and Figure 2.

Specifically, as discussed at page 6, lines 3-11 and page 10, lines 3-7, the chromium coat film is coupled to the metallic material at the interface, adhesion of this film is improved during heat treatment, and corrosion resistance is improved by oxidizing. As shown in Figure 2, oxygen is present at least up to 100 nm in the depth. Thus, the chromium coat film itself adhered to the metallic material is at least 100 nm in thickness.

That is, if the coating material is sufficiently thick, a chromium-oxide passivation film is formed at the outmost surface and a chromium layer remains under the chromium-oxide passivation when applying a heat treatment (and coupled/adhered to the metallic material), the advantage being that if the passivation film itself is defective, the passivation film can be formed again because the underlying chromium layer remains, which is not oxidized under the passivation film.

Claims 3 and 5-7 remain in this application.

Claim Rejections-35 USC §112

Claims 3, 5 and 6 were rejected under 35 U.S.C. §112, first paragraph, for not complying with the written description requirement. This rejection is respectfully traversed for the reasons below.

The position of the Official Action was that Figure 2 does not sufficiently support the recitation "said film consisting of Cr_2O_3 at a depth approximately 30 nm from the outermost surface". Claim 3 no longer includes this recitation.

The new recitation refers to chromium coating itself being at least 100 nm in thickness. This is supported by, for example, page 6, lines 3-11 and page 10, lines 3-7 of the specification in view of Figure 2. The chromium coat film is described as being coupled to the metallic material at the interface, adhesion of this film is improved during heat treatment, and corrosion resistance is improved by oxidizing (forming the chromium-oxide film). As shown in Figure 2, oxygen is present at least up to 100 nm in the depth. Thus, the chromium coat film itself is at least 100 nm in thickness.

New claim 7 is similar to claim 3, and also refers to relative concentrations of oxygen and chromium as disclosed by Figure 2.

Therefore, claim 3, as well as claims 5-7, comply with the written description, and withdrawal of the rejection is respectfully requested.

Claim Rejections-35 USC §103

Claims 3, 5 and 6 were rejected under 35 U.S.C. §103(a) as being unpatentable over WILKINSON U.S. 3,480,483 ("WILKINSON") in view of OHMI EP 0725160A1 ("OHMI"). This rejection is respectfully traversed for the reasons below.

WILKINSON was offered for teaching a method for making a metallic material (a razor blade edge) with a chromium-oxide passivation film by depositing a chromium layer of less than 400 angstroms, and OHMI was offered for teaching a step of baking at 100-200°C in a high purity inert gas to remove any adhering moisture.

The position of the Official Action is that it would have been obvious to combine these references so as to remove any adhering moisture from the surface of the metal material of WILKINSON so as to arrive at the claimed invention.

However, WILKINSON fails to disclose or suggest a chromium coat film of at least 100 nm in thickness as in claim 3, or a presence of oxygen in the passivation film at a depth of 100 nm as recited in claim 7.

Instead, WILKINSON includes a thinner chromium coat layer of less than 400 Angstroms, or 40nm. As a result, the

surface of the metallic surface would also be oxidized when a heat treatment is applied. As a result, adhesion becomes worse.

As discussed previously, if a coating material is sufficiently thick, e.g., at least 100 nm, a chromium-oxide passivation film is formed at the outermost surface and a chromium layer remains under the chromium-oxide passivation when applying a heat treatment (and coupled/adhered to the metallic material). The advantage is that if the passivation film itself is defective, the passivation film can be formed again because the underlying chromium layer remains, which is not oxidized under the passivation film.

Furthermore, in order to even approach the claimed invention it would have been contrary to the teachings of WILKINSON, where a chromate layer limited to less than 400 Angstroms (40 nm) is disclosed, and preferably less than 100 Angstroms (10 nm). See, e.g., column 1, lines 45-50.

Therefore, the proposed combination does not render obvious independent claims 3 and 7, and dependent claims 5 and 6, and withdrawal of the rejection is respectfully requested.

Conclusion

In view of the amendment to the claims and the foregoing remarks, this application is in condition for allowance at the time of the next Official Action. Allowance and passage to issue on that basis is respectfully requested.

Should there be any matters that need to be resolved in the present application, the Examiner is respectfully requested to contact the undersigned at the telephone number listed below.

The Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to our credit card which is being paid online simultaneously herewith for any additional fees required under 37 C.F.R. § 1.16 or under 37 C.F.R. § 1.17.

Respectfully submitted,

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